Digitized by the Internet Archive
in 2026

https://archive.org/details/computers-and-biomedical-research_1986_19_contents

Computers and Biomedical Research

AN INTERNATIONAL JOURNAL

An Official Publication of the American Association for Medical Systems and Informatics

Endorsed by the American College of Medical Informatics

EDITOR: Homer R. Warner

EDITORIAL BOARD:

Hiroshi Abe
G. Octo Barnett
Morris F. Collen
Jerome R. Cox, Jr.
James F. Fries
David Garfinkel
William E. Hammond
Hubert Pipberger
Arnold W. Pratt
T. Allan Pryor
Edward H. Shortliffe
William W. Stead
William S. Yamamoto

VOLUME 19, 1986

ACADEMIC PRESS, INC.

Harcourt Brace Jovanovich, Publishers

San Diego Orlando New York Austin Boston
London Sydney Tokyo Toronto

Copyright © 1986 by Academic Press, Inc.

All rights reserved

No part of this publication may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (27 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1986 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0010-4809/86 $3.00

MADE IN THE UNITED STATES OF AMERICA

CONTENTS OF VOLUME 19

Number 1, February 1986

David E. Booth and Thomas L. Isenhour. On Robust Partial Discriminant Analysis as a Decision-Making Tool with Clinical and Analytical Chemical Data 1

S. Quaglini, M. Stefanelli, G. Barosi, and A. Berzuini. ANEMIA: An Expert Consultation System 13

Jan A. Kors, Jan L. Talmon, and Jan H. van Bemmel. Multilead ECG Analysis 28

C. R. Mol, J. M. Burridge, and A. J. Morffew. Three-Dimensional Graphics Display of X-Ray Angiography Data 47

Margaret G. E. Peterson and Marcia A. Testa. Rank Order Scaling in Taste Evaluation 56

Klaus-Peter Adlassnig and Gernot Kolarz. Representation and Semiautomatic Acquisition of Medical Knowledge in CADIAG-1 and CADIAG-2 63

B. Auvert, Ph. Aegerter, F. Van Look, Le Thi Huong Du, Ph. Boutin, J. L. Monier, X. Emmanuelli, V. Gilbos, and E. Benillouche. A Hand-Held Decision-Aid System Designed for Rural Health Workers 80

Rork Kuick, Eric Boerwinkle, Samir M. Hanash, and Charles F. Sing. A Statistical Analysis of Spot Variation Using the Two-Dimensional Polyacrylamide Gel Electrophoresis 90

Steen Fugleberg, Niels Løkkegaard, and Søren Overgaard. Computer-Assisted Diagnosis of Acute Azotemia 103

Number 2, April 1986

Larry E. Stanfel. Applications of Clustering Theory to Cancer Mortality Data 117

Anthony Ayiomamitis. Logistic Curve Fitting and Parameter Estimation Using Nonlinear Noniterative Least-Squares Regression Analysis 142

Kenneth G. Manton, Eric Stallard, John P. Creason, Wilson B. Riggan, and Max A. Woodbury. Compartment Model Approaches for Estimating the Parameters of a Chronic Disease Process under Changing Risk Factor Exposures 151

K. E. Oerter, V. Guardabasso, and D. Rodbard. Detection and Characterization of Peaks and Estimation of Instantaneous Secretory Rate for Episodic Pulsatile Hormone Secretion 170

Number 3, June 1986

N. Alperin and D. Sadeh. An Improved Method for On-Line Averaging and Detecting of ECG Waveforms 193
V. Abraira and J. M. Ibarz. Spectral Estimation of Temporal Series at Unequal Intervals 203
J. P. Marques de Sá and C. Abreu-Lima. A New ECG Classifier Based on Linear Prediction Techniques 213
Masahiko Okada and Mihoko Okada. An Algorithm to Manage Variable-Length Records for Highly Portable Clinical Data Base Systems 224
Marek Malik, Thomas Cochrane, and A. John Camm. Computer Simulation of Cardiac Rhythm and Artificial Pacemakers Using a Ten-Element Heart Model 237
Gregory C. Critchfield, Keith E. Willard, and Donald P. Connelly. Probabilistic Sensitivity Analysis Methods for General Decision Models 254
Shimon Abboud, Israel Bruderman, and Dror Sadeh. Frequency and Time Domain Analysis of Airflow Breath Patterns in Patients with Chronic Obstructive Airway Disease 266
Sid J. Schneider and Jay Tooley. Self-Help Computer Conferencing 274
A. D. Lévy-Mandel, A. N. Venetsanopoulos, and J. K. Tsotsos. Knowledge-Based Landmarking of Cephalograms 282

Number 4, August 1986

G. Mingrone, A. V. Greco, and A. Bertuzzi. Prediction of Lithogenic Character of Human Bile by a Quaternary System 311
R. J. Marshall. The Determination of Peaks in Biological Waveforms 319
Peter Schmidlin, John H. Clorius, Eva-Maria Lubosch, Heiner Siems, and Kurt Dreikorn. Evaluation of Scintigraphic Data of Renal Transplants 330
Karl Lonberg-Holm, Lawrence B. Sandberg, Muriel S. Doleman, and Aaron J. Owens. Classification of Malnutrition by Statistical Analysis of Quantitative Two-Dimensional Gel Electrophoresis of Plasma Proteins 340
Jeffrey S. Prothero and John W. Prothero. Three-Dimensional Reconstruction from Serial Sections. IV. The Reassembly Problem... 361
Sudha Jain. Markov Chain Model and Its Application 374
A. Moise, R. Salamon, M. Raissis, P. Nanopoulos, and B. Clement. Constrained Poststratification 379

Number 5, October 1986

F. Pinciroli, R. Rossi, L. Vergani, P. Carnevali, S. Mantero, and O. Parigi. Remarks and Experiments on the Construction of Respiratory Waveforms from Electrocardiographic Tracings 391
David S. Buckles and Kenneth W. Hewett. Assessment of the Maximum Frequency Components and Digital Sampling of Cardiac Purkinje Fiber Action Potentials 410
J. A. van Alsté, W. van Eck, and O. E. Herrmann. ECG Baseline Wander Reduction Using Linear Phase Filters 417
Thinh V. Nguyen and Jack Sklansky. Computing the Skeleton of Coronary Arteries in Cineangiograms 428
S. Gaglio, C. Ruggiero, G. Spinelli, G. Bonadonna, P. Valagussa, and C. Nicolini. BREASTCAN: An Expert System for Postoperative Breast Cancer Therapy 445
Evlin L. Kinney. Expert System Detection of Drug Interactions: Results in Consecutive Inpatients 462
Henry Rusinek. Multicompartmental Analysis of Tracer Clearance and Its Application to Cerebral Blood Flow Measurement 468
Martha A. Lundberg, Richard L. Hughson, Kenneth H. Weisiger, Richard H. Jones, and George D. Swanson. Computerized Estimation of Lactate Threshold 481
J. M. Irving and I. K. Crombie. The Use of Microcomputers for Data Management in a Large Epidemiological Survey 487

Number 6, December 1986

Robert R. Rawlings, John W. Rohrbaugh, Henri Begleiter, and Michael J. Eckardt. Spectral Methods for Principal Components Analysis of Event-Related Brain Potentials 497
Michael A. Procter, Curtis W. Ponton, and Donald G. Jamieson. Programs to Produce High Quality Dichotic Tapes for Central Auditory Testing 508
G. Baselli, S. Cerutti, S. Civardi, D. Liberati, F. Lombardi, A. Malliani, and M. Pagani. Spectral and Cross-Spectral Analysis of Heart Rate and Arterial Blood Pressure Variability Signals 520
Mark J. West and Jan Skytte. Anatomical Modeling with Computer-Aided Design 535
I. K. Crombie and J. M. Irving. An Investigation of Data Entry Methods with a Personal Computer 543
Martien J. Quaak, R. Frans Westerman, Jan A. Schouten, Arie Hasman, and Jan H. van Bemmel. Appraisal of Computerized

Medical Histories: Comparisons between Computerized and Conventional Records 551
D. J. POTTER. Parallel Algorithms for the Analysis of Two-Dimensional Electrophoresis Gels 565
MARK ESPELAND. Estimation of Growth Curves from Longitudinal Data Collected at Irregular Time Intervals 575
RICHARD M. ENGEMAN, DAVID L. OTIS, AND WILLIAM E. DUSENBERRY. Small Sample Properties of Some Parametric Bioassay Estimators of the LD_{90} 588
HENK P. WESTERHOF, PETER C. G. M. SOLLET, AND JAN H. VAN BEMMEL. Computerized History Taking for Training Medical Students 596

AUTHOR INDEX FOR VOLUME 19 606

Information for Authors

Computers and Biomedical Research accepts papers for review with the understanding that the same work has not been and will not be nor is presently submitted elsewhere, and that its submission for publication has been approved by all of the authors and by the institution where the work was carried out; further, that any person cited as a source of personal communications has approved such citation. Written authorization may be required at the Editor's discretion. Articles and any other material published in *Computers and Biomedical Research* represent the opinions of the author(s) and should not be construed to reflect the opinions of the Editor(s) and the Publisher.

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the journal.

All manuscripts should be submitted to the Editor:

Dr. Homer R. Warner
Department of Medical Informatics
University of Utah School of Medicine
Salt Lake City, Utah 84132

Whenever a previously published paper by the author is important background for methods, data, or discussion in a manuscript, two reprints of the paper containing such material should accompany the manuscript to assist reviewers.

Manuscripts returned to authors for revision are considered "accepted for publication" as of the date an acceptable revised complete manuscript is returned to the editorial office. The editors and publishers cannot assume responsibility for manuscripts lost in the mail. Authors should therefore retain a complete copy for their files.

Form. Manuscripts should be typewritten and double-spaced throughout (including tables, footnotes, references, and figure captions); the original typescript should be prepared on one side of a good grade of $8\frac{1}{2} \times 11$-inch white paper, with 1-inch margins on all sides. Mimeographed or duplicated manuscripts will be accepted *if they are indistinguishable from good typed copies.*

Submit two complete copies in order to expedite processing of the manuscript. Each copy *must* include all figures and tables.

Number the pages consecutively. *Page 1* should contain the article title, author(s), and affiliation(s); at the bottom of the page type a short running head title not exceeding 45 characters (including spaces), and the name and complete mailing address (including zip code) of the person to whom proofs should be sent. *Page 2* should contain a short abstract, approximately 100 to 150 words in length.

Headings. The organization of the paper must be clearly indicated by appropriate headings and subheadings.

Abbreviations. Do not use final periods after abbreviations of measure (cm, sec, kg, etc.) in text or in tables, except for "in." (inch). Use the American Chemical Society *Style Manual*, 1986, as a guide.

List of Symbols. A typewritten list of identified symbols should be submitted along with the manuscript. The list should not define the symbols mathematically, but should serve to identify them typographically. The list will not appear in print, but is essential in order to avoid costly corrections in proof.

Equations. Number equations consecutively, with the number placed in square brackets to the extreme right of the equation. Refer to equations as Eq. [3] or simply [3] except at the beginning of a sentence, when the word Equation should be spelled out. Punctuate equations to conform to their place in the syntax of the sentence.

Footnotes. Use only when absolutely necessary, in which case type the footnotes consecutively, double-spaced, on a separate sheet of paper in the order of their appearance in the text. Use Arabic numbers 1, 2, etc. In the text refer footnotes by superscript 1, 2, etc. Footnotes to the title should be indicated by superscript*, †, etc.

Tables. Number tables consecutively with Arabic numerals in order of their appearance in the text. Type each table, double-spaced throughout, on a separate sheet; avoid vertical rules. Supply a short descriptive title below the table number. Type table footnotes, lettered *a, b,* etc., at the end of the table.

Figures. These should be numbered with Arabic numerals and should be mentioned consecutively in the text. Legends are to be typed together on a separate sheet.

It is essential that all illustrations be drawn with a lettering set, and therefore in finished form ready for the engraver. Lettering on the original drawing should be large enough to be legible after reduction to one-third. Graphs should be plotted with black India ink on light blue coordinate paper, no larger than $8\frac{1}{2} \times 11$ inches, with coordinates properly labeled; grid lines that are to show in the engraving should be inked in black. Photographs should be submitted as glossy prints (5×7 or 8×10 inches) and not marred by staples, paper clips, or pencil marks. Original drawings no larger than $8\frac{1}{2} \times 11$ inches are preferred.

Xerox copies are not acceptable.

Charges to authors. Exceptionally numerous illustrations or elaborate tables will require special arrangement with the publisher for sharing the cost of reproduction. Color figures or plates will be accepted only if the authors defray the cost.

References. These should be cited in the text by consecutive underlined numbers in parentheses and listed at the end of the paper in numerical order. Note the following style for book and journal citations:

1. Hess, C. F., and Brodda, K. On the optimum selection of diagnostic tests in computer-aided differential diagnosis. *Comput. Biomed. Res.* **17,** 389 (1984).
2. Sterling, T. D., and Perry, H. Computation of radiation dosages. *In* "Computers in Biomedical Research" (R. W. Stacy and B. D. Waxman, Eds.), Vol. 1, pp. 439–464. Academic Press, New York, 1965.
3. Winters, R. W., Engel, K., and Dell, R. B. "Acid Base Physiology in Medicine, a Self Instruction Program." The London Co., Westlake, Ohio, 1967.

Abbreviations of journal names should follow the style of *Chemical Abstracts Service Source Index,* 1985. Unpublished observations and personal communications should be cited in the text as such, and should not be included in the reference list.

Author's alterations in excess of 10% of the cost of composition will be charged to the author.

Reprints. 50 reprints will be supplied free of charge. Additional reprints can be ordered on the form accompanying the proofs.